THE MAKING OF A MODERN SKYSCRAPER DESCRIBED IN DETAIL

The Construction of the Mutual Assurance Society's Massive Structure.

FIRE-PROOFING EFFECTIVE

Its Marble Halls, Magnificent Stairways and Stately Court Entrance.

The new and elegant nine-story fireproof building of the Mutual Assurance Society at the southeast corner of Ninth and Main Streets, just completed by John T. Wilson, general contractor, is by long odds the handsomest, most substantial and imposing office structure in the city. It will compare with any in the South, and is the result of the skillful application of the most improved building methods in every line, working with the best attainable materials. Great care was taken to make it fireproof. The structure is built upon massive concrete and stone foundations sunk to a solid base far below the street level, and upon these rest the cast iron bases and the structural steel columns and sills and beams. The inner structure is a complete steel and iron frame or skeleton of massive construction and powerful strength. This shell is inclosed in a coat of stone and brick, completely covering the metal shell or frame. With the steel is another structure of tiles, cement and fire-proofing, the entire building being regarded as one of the best of its class in this country. The cost of the entire structure covering nearly half an acre of one of the busiest blocks of the city is approximately $600,000.

The evolution of a sky-scraper is a very interesting process, as the thousands who have watched the progress of work on this magnificent structure from the beginning of the excavations to the brushing of the stone front will attest. The excavation of the building site was sublet to Phillips & Allport, of this city, and the prodigious task was undertaken and completed promptly, despite unforeseen difficulties encountered. The old structures which occupied the site had to be razed and their materials removed to permit the beginning of work and the placing of materials for the new cloud-climber.

The excavation for the foundations and basement and sub-basement extended to a depth of twenty-five feet below the Main Street level and to a depth of twelve feet below the alley level on the southern side of the building, and embraced a plot 103 by 150 feet in area. Fully ten thousand cubic yards of earth had to be removed in the work.

Has Safe Foundations.

There are fifty-two columns in the building, each of which rests upon an independent concrete and steel pier or foundation of its own. At the base of each pier borings were made at least twenty feet deeper than the piers were to go, and their foundations were carried down to a uniform hard soil of compact hard gravel or of clay. After these piers had been excavated, the concrete and steel beam grillage was put in and back-filled and puddled. As the foundations of the buildings adjoining on the east extended only fifteen feet above the cellar floor of the new buildings, it was found necessary to underpin them. This was done and their foundations were carried downward below the level of the new piers. The delicate task was accomplished without a single crack or the least settlement of the old walls adjoining.

The boiler room in the southeast corner had to be excavated about eighteen or twenty feet below the alley level in the rear, and, in addition, to the concrete base, two heavy steel box girders, weighing about twelve tons each, were put in to distribute the load equally over the surface. The bank had to be sheet piled with particular strength here to prevent the adjoining building and the alley from caving in. The greatest trouble in the excavations for the foundation was experienced at the Main Street line, and for a distance of about fifty feet along Ninth Street, where much of the ground had been "filled" or "made." Very heavy sheet piling and bracing were put in, but persistent and heavy rains came which put such a strain on the bracing that the heavy 12x12 timbers were snapped off, letting in part of the piling. Permission was then secured from the city to slope the banks back to the car tracks. New piling was put in and the work thereafter was carried forward without a hitch.

The concrete piers for the structure were put in by W. P. Veitch, contractor, of this city, who also put in the wall footings, the cement floors in cellar, boiler and engine rooms and laid the granolithic walks around the building. On these piers were set cast-iron column bases upon which the columns are erected. The steel work was all done by S. Fischer Miller, now of the Miller-Collins Company, of 1133 Broadway, New York. The columns are of cast-iron, but all the other structural work is of steel.

Granite and Limestone Front.

Up to the first story sills, the exterior of the structure is of blue granite, furnished and set by Allan Netherwood, contractor, of Richmond. He also had and executed the contract for the Bedford limestone, with which the building is faced from the first story sills to the ninth floor. The alley and the east walls are faced with light-colored brick laid up by the Fulton Brick Works, and all exterior walls were backed up by them as well. They also set and backed up the terra cotta, with which the ninth story is faced, to match the limestone. This story was carried up and the roof put on in advance of lower stories, making it dry below, so that all other work could be carried on without fear of damage from the weather or interruptions due thereto.

As fast as the steel frame was erected the exterior walls were carried up and the Metropolitan Fire Proofing Company's system of floors were put in. On the top of this fire-proofing was placed a cinder concrete fill, imbedded in which are beveled floor strips, to which the finished floors were afterwards nailed.

All the wood frames were furnished by W. J. Whitehurst, of Richmond, which were built in as the walls progressed. As soon as a story was closed in and often before, the hollow-tile fire-proofing partitions were built, dividing the floors of the big structure into offices. Below the Metropolitan floors the same company hung metal lath ceilings and the hanging of these was at once followed by the plasterers.

The partitions are of four inch and six inch hollow tiles, laid up in cement mortar. All the outside walls were furred with the same material, which serves to keep out all dampness, and also to cover all plumbing, steam heating, electric pipes, etc., none of which are left exposed. Of the same material (tiles) are constructed four pipe shafts, extending from cellar to roof, two in each wing. Two of them contain all telephone, ticker and telegraph call wires, the other two containing and enclosing all main electric wires. The telephone and ticker wires for each floor are taken out of the shafts at the level of the hall picture moulding and follow the same in a prepared groove. At each office a piece of porcelain tubing is run through the partition in which the 'phone wire is inserted and carried behind the picture moulding to the point in the office where desired.

Well Constructed Roof.

The roof of the building has for a foundation the regular Metropolitan Fire-Proofing Company system, and is graded off with cinder concrete, with a smooth topping. On this are six layers of roofing felt, asphalted. Then comes layers of concrete, in which are embedded what are known technically as T-new flat roof-tiles, and all grouted. All the flashing is of copper. The skylights are galvanized iron ventilating turret skylights, with wire glass. The cornice is of 16 ounce polished copper. All this work and the roof were done by Reuben Burton, contractor, of Richmond, Va.

The ornamental iron work in the building was furnished by the L. Schreiber Sons Company, of which Mr. William Campbell is the local agent, and it is all of the finest workmanship. The elevator fronts, stair work, ornamental gates, etc., are all of special designs, made for this building. Their work includes all stairways from cellar to roof, all elevator fronts, cast iron exterior work, iron rails around the areas, ornamental fence and gates in the Ninth Street court, etc., and also the burglar and fireproof vault in the offices of the Mutual Assurance Society on the second floor.

The frames and all interior woodwork were furnished by W. J. Whitehurst, of Richmond, Va. All trimmings, doors, etc., throughout the buildings, except those in the Society's offices, are of quarter-sawed oak of the best quality. The sash are of white pine. In the Society's suite of offices on the second floor, the directors' room is finished in mahogany, and their general officers in white pine. This wood work was all put in place by J. T. Wilson, the general contractor for the structure. In each office there is a base and picture moulding of oak, and in the corridors chair rail and picture moulding, the base there being of Italian marble.

The glass throughout the building was furnished and set by Binswanger & Co., of Richmond, Va. All the interior partition glass above the first floor is quarter inch colonial glass. In the basement and first story it is three-sixteenths inch ground plate, with silver embossed border. The windows in the east wall have quarter inch clear plate wire glass, for protection against fires in adjoining property. All the other glass is of the quarter inch clear polished plate glass. In each toilet room a large plate glass mirror is furnished.

Marble and Mosaic Work.

The marble, mosaic and terrazza work were done by the Standard Marble Works, of Cincinnati. Their work includes also all marble treads of stairs and all partitions and wainscotting in the toilet rooms to a height of six feet six inches. The main basement wall is of Italian marble from floor to ornamental plaster cornice; all work being panelled. The main entrance hall of the first story is more elaborate, the panels being of English vein marble with Blanco P borders, the remainder being of Italian marble. All the corridors have marble bases and plinth blocks. The first story hall and vestibule are laid in white marble mosaic work, with ornamental border and handsome centerpiece in the vestibule.

The floors in the office suite of the Mutual Assurance Society on the second floor are laid up completely with interlocking rubber tiles of highly ornamental design. The halls and corridors above the first floor are laid with plain centres of terrazza, with six inch border of marble mosaic. The court bulkhead is also floored with the same material, all of which was polished by electric polishers. The floors of the toilet rooms are tiled with hexagonal white vitrified tiles, extra thick. The engine room floor is tiled with red Welsh tiles, imported especially for this building.

The floors in the various offices are of edge grain yellow pine throughout, being laid on beveled sleepers imbedded in cinder concrete.

The hardware in general throughout the building is plain bronze. In the Mutual Assurance Society's suite it is of old brass finish, and that in the main entrance is of statuary bronze.

The painting and decorating throughout the building was done by the W. P. Nelson Company, of Chicago and Baltimore. All oak and mahogany is varnished and rubbed work. The ornamental iron is to be finished in antique verdigris effect. All the floors are finished in oil. The white pine trimmings in the company's offices are finished in white enamel. All the plastered walls throughout are shellacked and painted with three coats of lead and oil, stippled.

Steam Heating and Boilers.

The steam heating throughout the building was put in by Gillis & Geoghegan, of New York.

This firm provided the hot water heater for the supply of hot water. The blow-off tank provided is three feet in diameter by eight feet long. The structure is heated by direct radiation by means of vertical Bundy standard radiators, 24 inches high, having a total of 12,638 square feet of radiating surface. Steam is carried to attic by a 4 inch live steam line, and is thence distributed downward after pressure is reduced, through 23 sets of steam risers. There are automatic air valves on all radiators which are all bronzed.

The Stirling Company furnished and installed three water-tube boilers, 175 horse power each, having an aggregate of 1,745 square feet of heating surface and 37.5 square feet of grate surface. They are set two in a battery, and one single with all attachments, and smoke flue connected to stack, which is of structural steel. This steel stack is six feet in diameter. There are in the building four duplex Worthington pumps, two for the boiler feed and two for the fire pumps. The other pumps are cross connected, so that they, too, can be used in case of a fire.

The plumbing in the building consists of all sewer lines, rain water consists of all sewer lines, rain water leaders—eight in all, vent pipes, toilet room fixtures, wash basins, etc. The wash basins of lavatories are so adjusted that by simply pressing a button, the water runs until it reaches a certain height in the basin and then is automatically shut off. Each general toilet room contains also a janitor's closet and slop sink. The engineer's toilet is provided with shower bath. For the water supply there is in the basement a storage tank 14x8x6 feet, of heavy iron. In the cellar is a double cyclinder charcoal filter tank of a capacity of 150 gallons per minute furnishing clear water. Meters are placed at the two water supplies in the alley and in Main Street. The hot water service heater is installed in the cellar for hot water supply. Fire lines are run into each wing and on each floor two water connections are provided for fire purposes, and for each line there is placed a brass, nickel plated Howard rack for fire hose, 75 feet of which, with nozzle is provided for each connection. All halls, the engine rooms, boiler rooms, coal bunkers and toilets are piped for gas.

The Modern Elevators.

The elevators in the building are among its features in the matters of novelty and excellence of service. They were put in by the Otis Elevator Company, and the plant consists of five passenger electric elevators, one electric freight lift, and one electric ash hoist. The size of the elevator cars is five and one-half by six feet each. One of the passenger cars can be transformed into a freight lift for hoisting safes by simply changing the gearing. The passenger elevators are capable of lifting a maximum load of 2,500 pounds each, and of traveling at a speed of three hundred feet per minute with a load of 2,000 pounds. The safe-lifting car will lift 5,000 pounds. The cars are of ornamental iron, with folding gates and interlocking rubber tile floors. They are provided with all safety devices, emergency brakes, etc. At the basement and on the first floor are a number of indicators, showing the exact location of the car at all times. At each floor is installed the Armstrong flash signal device, which is operated in this way: On each floor are two push buttons, one marked "up," the other "down." There are two electric lights in front of each car in each story, the upper one white, the lower red. For instance: A person wishing to go up from any floor presses the "up" button, and the white light opposite the next car going up immediately lights, and as this car approaches the floor a light flashes in the car, so that the operator knows where to stop. In case his car is loaded, he simply presses a button in the car, which transfers the signal to the next car going up. The car runs from the basement to the ninth floor. The ash hoist and the freight lift from the boiler room and cellar, respectively, to the first floor.

The steam engines are three in number, and are directly connected to generators and are regulated to run with full load 250 to 275 revolutions per minute. The generators are furnished and installed by the Westinghouse Company. Two are of 75 kilowatt capacity and one of 50 kilowatt, and they are of the very latest pattern and design. They generate current for operating the electric motors and also for lighting the entire building. The electric wiring is all modern in every particular. In the engine room is an enormous switch-board from which the current and wires branch to two wire shafts, and from there are distributed throughout each floor, two panel boards being provided at each floor—one for each wing, except in the basement and first story, where each room is separately provided for. Each office has an abundance of modern fixtures, both of the chandelier and wall bracket type.

There is a watchman clock device with stations on various floors as a check on the watchman, insuring faithful service on his part.

A mail chute is provided from ninth to first floor, so that letters can be mailed from any floor. The box is on the first floor and is a handsome one of electro-bronze.

Dimensions of the Building.

The dimensions of this great building, which is in the form of an E, with the center erased, are 103 by 150 feet, the 103 feet dimension being the Main Street front. The structure rises nine stories clear above the Main Street front, and has a depth of two stories below. The cellar is divided into three parts—the cellar proper, the engine room and the boiler room; the first for storage uses, the second and third for the uses indicated, the engine rooms containing the engines, generators, elevator machinery, pumps, etc. The boiler room embraces the boilers and coal bins.

During the construction of the building great trouble was experienced with running springs in the cellar. By means of an elaborate system of tile drains this water has all been collected and runs to a sink in the boiler room, where it is discharged into the sewer.

The basement is divided into eight large office rooms, and also contains rooms for the help, the engineers and firemen and toilet rooms.

The entrance to the basement offices of the building is by means of the ornamental bulkhead in the Ninth Street court. The first floor Main Street front has four large banking rooms and large offices in the south wing. The second floor south wing is divided into large offices, there being also four in the north wing, in addition to the Mutual Assurance Society's offices. The society's offices are three in number with private toilet rooms. The directors' room is finished in mahogany, the others in enameled white pine and with interlocking tile floors and ornamental plaster ceilings.

Floors 3 to 6 inclusive, are divided similarly into offices, each office being an outside room and having ample natural light and ventilation.

Floors 7 to 9 have smaller offices in the south wing.

There are toilet rooms on every floor and a large ladies' toilet room on the second floor, south wing.

The height of the building from the first floor or Main street level to the roof is 125 feet, and to the top of the towering stack, 145 feet.

The Main Street entrance to the building is in the massive colonnade portico style, have two handsome stone columns and beautifully carved arch doorway, the portico extending to the height of the second floor.

Mr. Wilson the Contractor.

Mr. John T. Wilson, the general contractor for the Mutual Assurance Society's building, established his business in this city in 1892 and in the thirteen years he has been engaged here, he has risen rapidly to the front rank among contractors, as his work attests. He is probably the largest contractor in Virginia, if not in the entire South. From the very start he has been successful and his business has grown steadily and rapidly on his merits and the standard of work done. Nothing is too large for him to tackle and he has a record of finishing every contract within the time-limit thereon. He executes all work intrusted to him in exact accordance with his agreements. In addition to the Mutual Assurance Society's building, which may justly be called his masterpiece, he has completed the following buildings or has them well advanced in course of construction:

The Eastern State Hospital building for the State of Virginia, at Williamsburg.

The large erecting shops of the American Locomotive Company, at Richmond.

The handsome new United States post-office building at Martinsville, Va.

The annex to the large department store structure of Miller & Rhoads, Richmond.

Handsome residence for Mr. J. J. Hickok, on West Franklin Street, Richmond.

The roundhouse for the Chesapeake and Ohio Railroad at Gladstone, Va., James River Division.

New Chesapeake and Ohio passenger station and train sheds at Charlottesville, Va.

The Young Men's Christian Association building at the University of Virginia.

The beautiful Beth Ahabah Temple, at Richmond, Va.

The handsome new house of worship for the congregation of the Second Baptist Church, Richmond.

Homestead cottage at the Virginia Hot Springs.

The Chesapeake and Ohio roundhouse at Huntington, W. Va.

The Chesapeake and Ohio passenger station at South Portsmouth, Ky., on the main line.

The Seaboard Air Line freight depot, at Durham, N. C.

The Blair flats, in Richmond, Va.

The handsome residences and numerous other buildings of minor importance in this city.

Mr. Wilson will submit estimates on

NEW OFFICE BUILDING OF THE MUTUAL ASSURNACE SOCIETY.

The Work of Many Artisans Contributed to This Majestic Office Building.

CONTRACTORS AND WORK

The Men Who Reared This Monument of Modern Steel and Stone Construction.

buildings of any size, in any part of the United States, and has the facilities to execute them promptly and accurately to contract in every respect. His offices are on the ninth floor of the Mutual Assurance Society's building, which he has just completed.

The building was designed by Clinton & Russell Architects, 32 Nassau Street, New York. The draughtsman in charge of the plans in their office, being Julian P. Fox, a former Richmond boy, who also was inspector of the architectural work.

The superintending engineer for the owners was Mr. E. T. D. Myers, Jr. For the contractors, the entire work was under the charge of Sam Ver Veer, managing engineer.

A remarkable record is the fact that up to the present there has been no fatal accident on the building; in fact, not an accident of any consequence whatever, which speaks well for the care exercised in the work.

Fire-Proofing System.

The Metropolitan system of fireproofing used in the construction of the Mutual building has been in use in the construction of the greatest buildings of this country for the last fifteen years, and was used in Paris extensively prior to that time. It is a patented process. The principle of the system is the reinforcement of floor plates by wire cables from one to three inches apart, brought to deflection and into tension between each pair of beams. The plate itself is of Metropolitan composition, which is composed principally of plaster of Paris and wood chips. This composition solidifies in a few minutes after being poured in place, and the wood centering can then be removed with safety. The resulting floor is sufficiently strong to be used at once, and is especially valuable as a working floor, thus greatly facilitating construction of buildings under present day methods.

The system is a scientific one, the materials used being sufficiently non-conducting to prevent the metal it covers from being heated to an injurious degree. A moderate thickness of this composition prevents the passage of almost all warmth. When exposed to flame for four or five hours the Metropolitan composition is attacked to a depth of from three-sixteenths to an inch, the remainder being unaffected by the intense heat. It does not crack or fly when a stream of water is played upon it, and even when thoroughly wet the composition shows no trace of disintegration.

In this method of construction metal clips are fastened to the bottom flanges of the floor beams, which support one inch by three-sixteenths inch flat iron bars, spaced from twelve to sixteen inches on centers running transversely with the floor beams. In order to take the plaster, approved metal lathing, coated with asphaltum, is fastened to the one inch flats. Cables composed of No. 12 galvanized wires, twisted, are carried over the floor beams and secured to walls by anchors or bars, or at the ends of beams by strong hooks. These cables are laid parallel and pass under round iron bars, midway between the beams, so as to cause the cables to deflect uniformly. These cables are one to three inches apart. Forms or centers are placed between the floor beams one inch below the round iron bars. The composition of plaster of Paris and wood chips is then poured in place and brought to a level about half an inch above the tops of the flanges of the floor beams, covering the webs of the beams, and forming a floor plate about four inches thick, ready for laying wood sleepers or concrete thereon. The exposed portions of the girders are covered with blocks of the same composition, one and a half inches thick, securely fastened in place. The result is the most effective fireproofing system yet devised.

The Marble Work.

The marble work in the building was put in by the Standard Marble Works, of which John M. Mueller, Jr., is proprietor, large importers, producers and manufacturers, of Cincinnati. This is an ornate and beautiful feature of a splendid structure. The following is a complete description of the interior finishing of the building:

The main entrance lobby and vestibule have ornamental Roman marble mosaic floors. The side walls from floor to plaster cornice, are lined with white Italian marble ashlar. The panels between the marble pilasters are of statuary vein Italian marble and the marble margin around said panels is made of a marble called Blanc P, which is an imported marble from Italy. All the doors have moulded marble architraves, including elevator openings. The marble is carried up the main staircase to second floor level. The basement lobby has what is called a Venetian marble mosaic floor. The walls are lined with white Italian marble ashlar from floor to the ornamental plaster cornice. The same grade of marble is used on the staircase being carried up to the first floor line finishing with moulded facia around the stair well. All corridors throughout the building have Venetian marble mosaic floors with white Italian marble base and Tennessee marble door sills. All toilet rooms on each floor are wainscoted with white Italian marble, and the partitions, etc., are all of the same marble. The partitions and wainscoting are finished with moulded cap and handsomely trimmed with nickel-plated brass fittings. The floors of all toilet rooms are laid with white hexagon Vitreous tile. The floors of engine room has a red Welsh tile floor with pink Tennessee marble base on walls. All the stairs throughout are of white marble.

The Stone Work.

The stone work in the building was cut